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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/676,411

09/30/2003

Robert Bristol

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7590

09/13/2006

BLAKELY SOKOLOFF TAYLOR & ZAFMAN  
12400 WILSHIRE BOULEVARD  
SEVENTH FLOOR  
LOS ANGELES, CA 90025-1030

EXAMINER

CHACKO DAVIS, DABORAH

ART UNIT

PAPER NUMBER

1756

DATE MAILED: 09/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/676,411

Applicant(s)

BRISTOL ET AL.

Examiner

Daborah Chacko-Davis

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                 | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 7-11, 15-19, and 23-24, are rejected under 35 U.S.C. 102(b) as being anticipated by U. S. Patent No. 5,565,304 (Honda).

Honda, in col 3, lines 40-59, in col 4, lines 28-30, in col 5, lines 34-46, in col 8, lines 10-20, and lines 45-52, discloses a method of forming a pattern in a semiconductor device including forming a resist layer on a device layer (etch-resistant layer), said resist layer includes a baseline material such as polyhydroxystyrene, highly absorbing material such as antimony, thinning the resist material coating to a desired thickness, and improving the efficiency of the PAG in the resist to capture the secondary electrons produced in the resist (when exposed to X-ray, the radiation generates secondary electrons in the resist, resulting in the interaction of the PAG to produce a halogen acid (PAG in the resist is triphenyl sulfonium tetrafluoroborate) that catalyses the crosslinking reactions, thereby increasing the efficiency of the PAG, and controlling the moieties generated due to irradiation (proximal to the PAG), pattern transferring the resist pattern formed to define areas of the device (claims 1-2, 7, 9-10, 15, 17-18, and 23). Honda, in col 5, lines 40-46, and in col 6, lines 53-55, discloses that the antimony is added in the claimed amount (5% to 30%) in the resist composition (claims 3, 11, and

19). Honda, in col 8, lines 53-55, discloses that the resist layer is exposed to X-ray irradiation (claims 8, 16, and 24).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 4, 12, and 20, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 5,565,304 (Honda) in view of U. S. Patent No. 6,753,129 (Livesay et al., hereinafter referred to as Livesay).

Honda is discussed in paragraph no. 2.

The difference between the claims and Honda is that Honda does not disclose the highly absorbing materials (claimed polymers) recited in claims 4, 12, and 20.

Livesay, in col 8, lines 45-58, discloses that the resist composition includes a fluoropolymer.

Therefore, it would be obvious to a skilled artisan to modify Honda by employing the absorbing material suggested by Livesay because Livesay, in col 5, lines 55-61, in col 7, lines 60-67, and in col 8, lines 20-57, discloses that adding fluoro polymers in resist compositions enables the formation of a uniform film on the substrate, and increases the surface hardness and dry etch resistance of the resist pattern.

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5. Claims 5, 13, and 21, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 5,565,304 (Honda) in view of U. S. Patent No. 7,049,044 (Gonsalves et al., hereinafter referred to as Gonsalves).

Honda is discussed in paragraph no. 2.

The difference between the claims and Honda is that Honda does not disclose that the resist layer is thinned to a thickness below 100nm (claims 5, 13, and 21).

Gonsalves, in col 14, lines 25-34, discloses forming a thin layer of resist with a thickness less than 100nm.

Therefore, it would be obvious to a skilled artisan to modify Honda by employing the thickness range suggested by Gonsalves because Honda, in col 8, lines 10-21, discloses thinning the resist layer to a desired thickness and Gonsalves, in col 2, lines 1-25, teaches using the resist layer compositions to form sub-100nm patterning in order to be applicable for next generation lithography.

6. Claims 6, 14, and 22, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 5,565,304 (Honda) in view of U. S. Patent No. 5,034,304 (Feely).

Honda is discussed in paragraph no. 2.

The difference between the claims and Honda is that Honda does not disclose increasing the PAG (photoacid generator) concentration in the resist (claims 6, 14, and 22).

Feely, in col 6, lines 15-35, discloses increasing the PAG concentration in the resist composition.

Therefore, it would be obvious to a skilled artisan to modify Honda by increasing the concentration of the PAG in the resist as suggested by Feely because Feely, in col 6, lines 15-35, discloses using higher concentrations of PAG in the resist enables the resist to be imageable in X-ray wavelengths, and enables the formation of a much higher image resolution.

### ***Response to Arguments***

7. Applicant's arguments, filed June 28, 2006, with respect to claims 1-24, have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you


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have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd

September 8, 2006.



**JOHN A. MCPHERSON**  
**PRIMARY EXAMINER**